

from William Robertson M.D.

REPORT

ON

THE CAUSES OF DEATH

AMONG THE ASSURED IN THE

Scottish Equitable Life Assurance Society

From 1831 to 1864

BEING A PERIOD OF THIRTY-THREE YEARS.

SUBMITTED TO THE BOARD OF DIRECTORS

BY WILLIAM ROBERTSON, M.D., F.R.S.E.

1865.

EDINBURGH : T. CONSTABLE,
PRINTER TO THE QUEEN, AND TO THE UNIVERSITY.

R E P O R T.

IN framing the following Medical Report on the Mortality experienced among persons assured in the Scottish Equitable Life Assurance Society, during the period of thirty-three years, commencing with the institution of the Society in 1831, I have endeavoured to lay a foundation for future Reports of a similar nature, and to state the results of the investigation which has been made, in Tables so arranged as to admit of ready comparison with the published experience of other Offices.

Any statement of mortality embracing the first few years of a Life Assurance Society's operations must necessarily be of a somewhat exceptional nature; for it must include a large number of deaths occurring at early ages, and within a very short period after assurance was effected. It is only long after an Assurance Society has reached its point of full development or maturity that the proportion of deaths occurring among such of its members as have lived up to, or exceeded, their tabular Expectation of Life, can become very considerable. Unless this be kept distinctly in mind, such a statement as this Report contains would perhaps appear discouraging. Were it indeed possible to exhibit in contrast, year by year, the numbers of Lives at Risk at each age, and the number of deaths occurring at each age, it would very surely be found that the mortality here recorded obeyed the same law as that observed in the

general population ; or rather, that the exclusion of such lives as are manifestly "bad" or "hazardous" had rendered the rate of mortality in each year more favourable to the Society than the rate upon which its calculations are based. But to include in this Report such a statement of "lives at risk," would involve enormous labour, and introduce considerations which clearly belong more to the province of the actuary than to that of the mere medical inquirer.

While I have endeavoured to steer clear of such details as constitute the business of the actuary, it is hoped that a great variety of matters useful to the medical or general statistician have received consideration in the course of this Report, and will be found conveniently illustrated in the appended Tables. Due pains have been taken to secure the correctness of the work on which these Tables are founded ; and by the kind assistance of the Manager of the Society, some of the more important and laborious steps of my computations have been checked or revised in his office. To Mr. Todd I am likewise indebted for various suggestions, and above all for advice as to the mode of abridging, by the use of cards, the information furnished by each set of death-papers. This method is of course familiar to actuaries ; but as it may be new to some of my professional brethren who may hereafter be engaged in inquiries like the present, I think it right here to record my opinion, that for simplicity, utility, and economy of labour, it is quite invaluable, more especially where the construction of a variety of tabular statements is contemplated.

As persons interested in vital statistics have many different modes of stating and viewing the results embodied in medical reports, I have tried to include in the Tables every possible detail as to age, sex, endurance, and expectation. The Expectation Tables which have been used are those contained in the

Appendix to the Registrar-General's Sixth Annual Report, pp. 655-658, which, at ordinary ages, differ very slightly from the Carlisle Table, and probably contain the most trustworthy data regarding the mortality of England that had ever been published, till within the last few months. Dr. Farr had, indeed, published in the Appendix to the Registrar-General's Twelfth Annual Report, in 1853, another Expectation Table; but as it was restricted to males,¹ and as one of the objects proposed in the present Report was to contrast the experience of male and female mortality, the earlier Table, containing columns for both sexes, has of course been preferred. And it is satisfactory now to find that Dr. Farr's most recently published "English Life Tables, 1864," agree so very closely as regards After-lifetime, or Expectation, with those contained in the Registrar-General's Sixth Report, that no appreciable error can result from the use here made of the latter.

The nomenclature and classification adopted in this Report are nearly the same as those recommended by Dr. Farr, and sanctioned by the authority of the Registrar-General for England. There seems to be peculiar advantage in following this mode of classification, as it is of course desirable that the results of the Society's experience should be made readily available for ordinary statistical purposes, and as most statements of mortality furnished by the medical officers of other Assurance Companies have been constructed on the model proposed by Dr. Farr. Various objections have been made to Dr. Farr's system, and it has at different times received from its author certain modifications, some of which do not appear to be improvements. In particular, I am disposed to object to the institution of a separate class for "Tubercular Diseases," by means of which

¹ A corresponding Table of female lives was published six years afterwards in the Appendix to the Registrar-General's Twentieth Annual Report.

Consumption is dissociated from Diseases of the Respiratory Organs, with which it seems of great importance that it should be grouped in reports on the Mortality of Life Assurance Companies. The class of "Old Age" is another which is, in my opinion, worse than superfluous, tending as it does to encourage a popular error, by giving a sort of sanction to the notion that many persons die of Senile Decay, without any particular disease. Probably most well-instructed physicians would hesitate to return "Old Age" as *per se* a cause of death. Finding that in Class II., which comprises Diseases of Uncertain Seat, "Debility" is given as one of the causes of death, it appears to me that it should include the Debility of Old Age, and under this head all deaths attributed in the Society's certificates to Senile Decay have in this Report been accordingly arranged. "Consumption" has been transferred to the class of Diseases of the Respiratory Organs. The changes above explained have necessitated corresponding alterations in the tabular statements of various Offices, whose mortality experience it has appeared interesting to contrast with that of the "Scottish Equitable." These alterations have been made with all due care, and on the authority of data contained in the reports of their different medical officers.

It is perhaps necessary here to warn non-professional readers that, even were the classification and nomenclature in use at the present time admittedly perfect, it by no means follows that deaths could be always referred to their true causes, and grouped under the most appropriate headings, in Mortality Tables. By way of illustration, it may be remarked that during the last thirty years the term "Dropsy" has been becoming gradually more and more restricted in its use. Formerly it was constantly met with in medical certificates; and in the published experience of the "London Equitable" in 1832, it

appears as the cause of at least 6 per cent. of the whole mortality. But since that time it has been clearly ascertained that a very large number of cases which would formerly have been at once classified as "Dropsies," are actually referrible to a chronic disease of the Kidney. It was only by degrees that the pathology of the Kidney became generally understood, and accordingly "Dropsey" was a not infrequent entry in the death-certificates of the "Scottish Equitable" between 1831 and 1842. But during the last ten or twelve years the term has almost ceased to be used in this way, and it is only when the medical attendant has been unable to detect the cause of a dropsy, that he now-a-days sets down the *symptom* "Dropsey" as the cause of a death. There can, however, be no doubt that the mortality from "Dropsey" must in most Mortality Tables be overstated, and that from "Disease of the Kidney," "Disease of the Heart," and "Disease of the Liver"—the most common causes of dropsical symptoms—under-estimated. Again, there is reason to believe that the relative frequency of "Apoplexy," "Paralysis," and "Disease of the Brain," as stated even in the most recent Tables, cannot be much relied on, though there is probably little error in the gross mortality attributed to all three causes united.

Another, and inevitable cause of error in medical reports, is the infrequency of post-mortem examinations. From this cause it follows that in a certain number of cases it is quite impossible to obtain a satisfactory certificate of the cause of death, and such evasive entries as "Cause Unascertained" and "Sudden Deaths" result to the discredit of statistics. Fortunately the entries under these heads bear but a small ratio to the gross mortality in the "Scottish Equitable" death-returns. But the infrequency of post-mortem examinations leads to another, and, it is to be feared, more considerable source of error, for it is

certain that in many doubtful cases deaths are attributed to a specific cause with less certainty than is desirable. In fact, the medical certificate of a death is too often founded upon mere probabilities, suggested by considerations insufficient to warrant any decided opinion. It is hardly necessary to remark that this source of uncertainty must in some degree vitiate most medical and statistical inquiries in which the relative frequency of the causes of death is involved.

It is satisfactory, in concluding these preliminary remarks, to notice the fact, that of late years the information furnished by this Society's death-certificates, is obviously far more minute and reliable than that which appears to have been accepted as sufficient in the earlier years of its experience. The improvement in this respect seems to have been progressive, and is no doubt mainly due to the efforts of my predecessor, Dr. Pagan, and to the co-operation of the medical men who have furnished the certificates. I have reason to believe that Dr. Pagan at one time contemplated such a revision of the Society's mortality experience as it has been my fortune to complete; and, indeed, many of the recent death-papers bear valuable marginal remarks in his handwriting, of which I have freely availed myself, and from which I am glad to take this opportunity of acknowledging that I have derived much assistance.

4

(A.) COMPARATIVE VIEW OF MORTALITY IN ENGLAND, AND IN FIVE SCOTTISH ASSURANCE OFFICES.

CLASSES OF DISEASES.	ENGLAND, 1848-54, Seven years. All the Males, and one-ninth of Females, dying between 15 and 85.	SCOTTISH WIDOWS' FUND. 1815-60, Forty-five years.	STANDARD. 1825-60, Thirty-five years.	NORTH BRITISH. 1823-60, Thirty-seven years.	SCOTTISH AMICABLE. 1826-60, Thirty-four years.	SCOTTISH EQUITABLE. 1831-64, Thirty-three years.
	Percentage.	Percentage.	Percentage.	Percentage.	Percentage.	Percentage.
CLASS I. Epidemic, etc.,.....	13'9773	14'3043	13'3333	14'3515	19'4049	12'3918
II. Of Uncertain Seat,	19'7776	8'9727	7'3927	14'3515	5'9506	8'4957
III. Of Nervous System,.....	10'3772	22'4100	19'8020	19'8005	16'8175	20'9957
IV. Of Respiratory do.,	32'4600	20'6762	23'5644	21'1052	23'9339	23'2143
V. Of Circulatory do.,	5'3537	11'0099	9'7690	9'3630	8'6674	11'8506
VI. Of Digestive do,	6'6714	12'3971	14'3234	10'3607	12'5485	11'9048
VII. Of Urinary do.,	2'2533	4'5514	4'4224	3'2233	2'9752	5'3571
VIII. Of Generative do.,	4'257	5'202	3'300	4'604	3'880	4'329
IX. Of Organs of Locomotion,	1'1220	9'103	5'281	2'302	9'055	8'658
X. Of Integumentary System,.....	4'117	0'867	1'320	2'302	5'174	5'411
XI. Violent Deaths,	5'9426	2'8175	4'6865	3'4536	5'5626	3'6796
XII. Of Unascertained Causes,.....	1'2275	1'3437	1'7162	3'0699	2'3285	2'706
	100' "	100' "	100' "	100' "	100' "	100' "

N.B.—In *all* these Tabular Statements, Class II. includes "Old Age," "Atrophy," "Debility," "Scrofula," "Syphilis," "Malignations," and "Sudden Deaths;" Class III. includes "Hydrocephalus;" Class IV. includes "Consumption;" Class VI. includes "Tabes Mesenterica;" Class VIII. includes "Metria;" Class X. includes "Uterine" and "Fistula;" Class XII. includes all deaths which cannot be referred to any precise cause.

The first column of Table (A) is computed from the numbers given in the Registrar-General's Eighteenth Annual Report, Appendix, p. 150, *et seq.* I have here thrown together into the classification used in the Scottish Equitable Death Schedule, the percentages deduced from the whole of the deaths of males, and *one-ninth* part of the whole deaths of females, which were registered in England in seven years, viz., 1848-54. But all deaths which occurred at ages below 15 or above 84 have been excluded from the computation. The column is thus made comparable with any Assurance Office's mortality experience, for the relative proportion of the sexes here assumed approximates closely to that which subsists among the members of the Scottish Equitable, and, it is believed, of other Assurance Companies. In the succeeding columns of Table (A), the mortality experience of the Scottish Widows' Fund, Standard, North British, and Scottish Amicable, is stated in a precisely similar manner, and is contrasted with that of the Scottish Equitable, which occupies the last column of the Table. The percentages relative to the four Offices first mentioned, have been calculated from the numbers given in the valuable published Reports of their medical officers, Dr. Begbie, Professor Christison, Dr. Burt, and Dr. Fleming. It must be kept in mind that in all these tabulated abstracts, and in every Table which accompanies the present Report, "Old Age" has been transferred to Class II., "Consumption" included in Class IV., among the diseases of the Respiratory System, and Class XII. reserved for such deaths as could not be referred to an ascertained cause.

There is, as might have been expected, a tolerably close agreement among the columns of Table (A) which exhibit the experience of the Assurance Offices; but it is at once seen that the percentages deduced from the Registrar General's Report are

very different. Various causes concur in producing this discrepancy. The relative proportions of those living at different ages are very different in a general population and in the policy-holders of an Assurance Company. In a general population, there is a far larger proportion of Old Age at risk than can exist in any of the Scottish Assurance Companies, and hence an enormous mortality from Senile Decay is contributed by "England" to Class II. At the earlier ages, likewise, there exists a similar disproportion. The ratio which the number of assured persons living between the ages 15 and 30, bears to the number of all assured persons alive between 15 and 85, may be roughly estimated at one to seven; while, in the general population of England, the ratio between the numbers alive within the above periods of life is one to three. Hence the relative proportion of deaths from the diseases of early life should be far greater in "England" than in Assurance experience, and, accordingly, such diseases as Scrofula and Consumption swell Classes II. and IV. in the English column of Table (A).

Much more frequent use is made of the term "Dropsy" in the certificates furnished to the Registrar-General than in the death-papers of Assurance Companies. It has been ascertained by computation, that fully $3\frac{1}{2}$ per cent. of the total deaths occurring in England at ages 15-85 are, in the Registrar-General's Eighteenth Annual Report, referred to this head, and consequently included in Class II., while in the Scottish Equitable experience, the deaths referred to "Dropsy" do not amount to $1\frac{1}{2}$ per cent.

These considerations illustrate the chief causes of the discrepancy which subsists between the statements contained in the first, and in the succeeding columns of Table (A). It seems hardly necessary to add that the influence of the selection of "good" lives practised by Assurance Companies, and the ex

clusion from assurance of those in the humblest stations of life ; of those manifestly labouring under serious disease ; of those whose personal or family history indicates proclivity to such disease ; and of those who follow dangerous or unhealthy occupations, must contribute to render the class of the assured a special one, differing, as regards the relative frequency of the various causes of mortality, from the general population of the country.

MORTALITY EXPERIENCE OF THE SCOTTISH EQUITABLE.

CLASS 1.—*Epidemic, Endemic, and Contagious Diseases.*—From Small-pox there have been five deaths, at the ages of 26, 37, 41, 50, and 60. All five occurred in males, who appear to have been vaccinated before their proposals of assurance were accepted.

Eight males died of Scarlatina, at ages between 20 and 43. One of them, it is stated, had Scarlet Fever before he became a member of the Society. It is not known whether any of the others had passed through attacks of the disease in childhood.

Diarrhœa proved fatal to 12 males and 1 female. Ten of these were aged 51 and upwards ; the oldest had all but completed his sixty-eighth year. One had, many years before assurance, suffered from “inflammation of the bowels ;” another from “a severe attack of gallstones ;” a third from “fistula.” Of another it is recorded that “the family history was in many points unsatisfactory.”

Dysentery numbered 24 victims, whereof 21 were males and 3 females. Of the males, one was a native of Jamaica ; one

died in Melbourne; other three appear to have contracted the disease in tropical climates; and one, who died in this country, had been, before his proposal was made, "subject to diarrhoea." One, though reported "sober and temperate," had, when his proposal was accepted, the appearance of "a free liver," and survived his acceptance little more than a year. Another, who died at the age of 41, after having been fifteen years assured, had, before his proposal was made, an attack of "inflammation of the lungs;" and as the fatal attack of dysentery was complicated with "debility" and " hæmoptysis," it is highly probable that the true cause of death was "pulmonary consumption." In nine of the cases the family history was "incomplete" or "decidedly unsatisfactory," and in three of them two or more members of the immediate family had died of consumption. It is interesting to note that one male, who died at Buenos Ayres in his sixty-eighth year, after having been fully fifteen years assured, stated in his proposal that he had lost his mother, a brother, and a sister, all by phthisis.

Cholera is stated as the cause of 22 deaths,—19 males and 3 females. Of these, one female, who died a few months after acceptance, was the wife of the notorious William Palmer, and her death might perhaps more properly have been referred to "irritant poisoning." Two males died of ordinary British Cholera. There remain 19 cases, which constitute the whole mortality which the Society has experienced from three epidemic visitations of Asiatic Cholera, a result on which the members have reason to congratulate themselves. It is, however, painful to observe, that at least three-fourths of these deaths occurred in persons who appear from the reports to have had excellent prospects of longevity when they became members of the Society.

Of Influenza there have been eight fatal cases,—seven males

and one female. These all occurred at ages between 51 and 67, and call for no special remark.

The gross mortality from Fever has been 6·82 per cent. of the deaths from all causes, which is a rather higher rate than that deduced from the Registrar-General's Reports on the Mortality of England. The rate in England for the seven years terminating with 1854 was about 5·6 per cent. The difference is probably due to the circumstance that a large proportion of those whose lives are assured reside in large cities, where the influence of fever epidemics chiefly manifests itself. The rate of 6·82 per cent. is, however, considerably lower than that experienced by any of the Assurance Societies whose Reports afford means of instituting a comparison on this head. The explanation of this fact seems to be, that in the latter part of the period over which the present investigation extends, several years are embraced during which the prevalence of fever has in this country sensibly diminished, and that three of these years are not included in the published experience of the Scottish Widows' Fund and other Offices. Among the members of the Scottish Equitable Society, Fever has caused 126 deaths; of which 117 occurred in males, and only 9 in females. Of these deaths, one was due to "pernicious intermittent," contracted in the malarious districts of Italy; another to "bilious remittent," occurring in Australia; a third to "yellow fever;" a fourth to "tropical fever," in Arracan; and a fifth to what the death-certificate rather vaguely terms "irritative fever." All five were males. Abstracting these five, there remain of deaths from the continued fevers of this country—Typhus, Typhoid, etc.,—112 males and 9 females. At first sight these numbers may seem to indicate that males are more liable to fever than females. There are undoubtedly circumstances which render the males of the labouring popu

lation especially prone to fever. It is merely necessary to advert to the vast numbers of male labourers so frequently collected for the construction of railway and other public works. The defiance of sanitary precautions by such bodies of workmen is unhappily quite notorious. But it is by no means certain that sex in any degree affects the proclivity to fever, or, at least, that among the members of the provident classes the disease occurs in males more frequently than in females. The experience of hospitals proves that one-eighth of cases of Typhus occurring in males are fatal, while only one-tenth of the cases occurring in females terminate by death. On applying the above ratio of comparative mortality, it may be computed that our 112 deaths of males from fever represent the result of 896 cases, while the nine deaths of females represent the result of 90 cases. It is therefore probable that fever has occurred in the proportion of ten male to each female case among the persons assured in this Society. But, since 10 to 1 is likewise the ratio of living males to living females among persons assured, it of course follows that our experience does not justify the inference that males are more liable to fever than females. The greater mortality among males is however indisputable.

It is not worth while to attempt to illustrate the comparative liability to Typhus of the members of different professions. The death-papers of this Society do not afford means of estimating the relative numbers of each profession "at risk," or consequently of deducing the ratio in which each may have suffered from typhus. It may however be useful to record that our death-list includes five members of the medical profession dead of fever. It is well known that medical men and clergymen are especially apt to suffer from this disease, — their duties frequently exposing them to the pernicious influences of contagion

and of infected localities. The five medical men were cut off at the ages of 25, 43, 44, 47, and 48. It is fortunate for Assurance Societies that most medical men have passed through the ordeal of typhus before they make proposals for assurance. There can be no doubt that one attack of "eruptive typhus" is a considerable protection against a second, just as is observed in the case of measles and scarlatina. And in Edinburgh, at least, the predisposition to typhus is so universal, that few medical men are actively employed for any considerable time, during an epidemic of fever, without contracting the disease, unless they enjoy the immunity which a previous attack confers. It is obvious that medical men, clergymen, and others, who labour much among the sick poor in hospitals, workhouses, or in the ill-ventilated and overcrowded dwellings of large cities, are far more eligible for assurance if fortified by an attack of typhus before their proposals are accepted. The losses which Assurance Societies sustain from deaths by fever are very considerable; for not only is the disease a cause of large mortality, but it is among the young and middle-aged that its victims are chiefly found. Reference may be made to the columns of Table (C) for confirmation of this last observation.

Erysipelas occasioned the deaths of 23 persons, of whom 2 were females. In two cases an arm or leg was the seat of the disease; in all the others the head was the part affected. Erysipelas is most frequently met with in persons of unsound or broken constitution; and accordingly, we find from the Society's reports, that seven of those who died had at former periods suffered from "jaundice," so-called "bilious disorders," "indigestion," "nephritis," or "accidents," while the family history of ten was "defective," and that of several "unsatisfactory."

The mortality from the whole class of *Epidemic, Endemic, and Contagious Diseases* has been smaller than might have been ex-

peeted; but this happy result evidently depends upon the recent cessation of Fever in an epidemic form, and it would be unreasonable to suppose that the future experience of the Society is likely uniformly to continue of a character equally satisfactory.

The average age of all who died of the diseases of Class I. was 47·18 years, and the "endurance" of the relative assurances was 8·60 years.

CLASS II.—*Diseases of uncertain seat.*—Three males appear to have died of what their death-certificates term "Inflammation." Although the part inflamed is in none of these cases mentioned, it is probable that the lungs or pleuræ were affected.

Two males and one female died of Hæmorrhage. In one of the former the source of hæmorrhage seems to have been in the kidneys or bladder, in the other the nature of the complaint cannot now be ascertained. The female died of hæmorrhage from the bowels and uterus. The few deaths which have been returned as due to "Hæmoptysis" have been referred to the heading "Diseases of the Lungs," etc., in Class IV.

"Dropsy" is a very vague and unsatisfactory term, under which we are obliged to classify 27 deaths,—23 of males, and 4 of females. With ordinary care all might have been referred to diseases of the heart, kidneys, or liver; and it is to be hoped that Dropsy may ere long disappear from the Society's death reports. Nine of the males died at ages between 63 and 84—only three were under 46—and the average age at death (both sexes included) was 56·58. One male, who died at 39, was a "spirit-dealer," "sometimes indulged to excess," and had lost a sister by consumption; another, who died at 41, was "gouty," and had the "appearance of a free

liver," while his family history was "indifferent;" a third, who died at 47, was "bilious and corpulent;" a fourth, who died at 49, had once had a "sort of paraplegia and giddiness;" a fifth, a native of Bombay, who died at 50, had been many years in India, and was known when accepted to have had a "chronic affection of the liver;" a sixth, who died at 53, had lost two brothers by consumption; a seventh, who died at 63, was a "rather free liver;" an eighth, who died at 74, had been cured of stone by lithotrity. It is doubtful whether any of these eight would have been accepted, during the last few years of the Society's operations, as fair average risks for assurance. The remaining nineteen appear to have been what is termed "unexceptionable lives" at the time when their proposals were accepted.

Nine males died of Abscess, and all at early ages. Two had before assurance suffered from "hæmoptysis," and one from "congestion of the liver, piles, and hæmorrhage." Only one of the nine seems to have belonged to the class of "select lives."

Nine persons died of Mortification. In four males, and in the solitary female case, the disease was senile gangrene. In one of the others, who died at 55, there was a complication of diseases—mortification of the fingers, jaundice, and dropsy; in another, mortification followed a surgical operation on the foot, and three members of the immediate family had died of consumption; in another, there had been "inflammation of the veins of the leg" before assurance. One male died of "purpura and debility" at the age of 42.

Carcinoma, which includes all malignant tumours and ulcerations, has been the cause of 54 deaths,—45 males and 9 females. The percentage on deaths from all causes is 2·92, very nearly. Although Cancer thus appears to have been a rather frequent cause of death, there can be little doubt that

its frequency is considerably understated, and that many obscure cases, referred by the medical reporters to disease of the stomach, liver, etc., were of a malignant nature. The relative proportion of female cases is smaller than might have been anticipated, for as cancer is said to be nearly three as frequent in females as in males, twelve or thirteen cases among the former might have been reasonably expected. The disease rarely manifests itself before middle life; hence seventeen of our cases occurred in persons who had lived 60 years and upwards, and the average age of the whole at death exceeded 54 years. In nineteen instances, the seat of disease was in the stomach, liver, or other viscera of the abdomen; in eight, it was in the rectum; in seven (one being a male), it was in the breast; in six, in the gullet; in four, in the neck or face; in two, in the mouth and tongue; in two, in the uterus; in one, in the groin; while in five the organ affected is not mentioned.

Cancer is usually considered a hereditary disease, in the same sense in which Consumption and Gout are regarded as hereditary. The occurrence of more than one case of malignant disease in the family of a person proposed for assurance, would very properly cause hesitation as to his eligibility. It does not appear from the reports relative to the proposals of our fifty-four cases of Carcinoma, that the disease had occurred, even in a single instance, in any relative of any one of them. In commenting on the mortality experience of the Standard Life Assurance Company, Dr. Christison, in 1853, remarked: "A variety of facts in ordinary professional experience, as well as observation in assurance inquiries, have led me to the conclusion that malignant diseases are part of the unfortunate heritage of the strumous constitution. Hence, in judging of the influence of family history, I am strongly inclined to think

that malignant diseases on the one hand, and consumption, tabes, and the like, on the other, may be regarded as equivalent." Without presuming to question the correctness of this opinion, which is founded upon the long experience of a most accurate observer, I think it right to point out that the Scottish Equitable death papers furnish no facts in its support. For if the deaths from consumption and from cancer were mutually complementary at the earlier and later stages of life, it might reasonably be expected that the same features in family history which we consider to indicate proclivity to consumption, would likewise be found of unusually frequent occurrence in the proposal-papers of those who die of cancer. Now, the reports in forty-three out of our fifty-four cases of cancer show that, at the time of proposal, they were all at least "fair," and for the most part "highly eligible" lives, untainted with hereditary disease of any sort. In seven of the remainder, there is certainly mention of consumption; but in only one of the seven does there appear to have been more than one death from consumption in the immediate family. In one other case it is recorded that the family history was "dubious." In the remaining three cases there existed personal objections to the proposals; thus one male, who died at 47 of cancer of the rectum three years after assurance, had hæmorrhoids; another, who likewise died at 47, had had "some sort of nervous or paralytic attack;" and the third, who died at 59 of cancer of the stomach, is reported to have been subject to "bilious complaints," and to have had "jaundice" and "hernia." It will be remarked, that in only about one-eighth of our cancer cases does there appear to have been any blot in the family history due to consumption, and that in only one case out of the whole fifty-four would the most scrupulous of boards have felt themselves justified in declining the proposal on account of

hereditary taint among the immediate relatives. But, as Dr. Christison pointed out in his Report for 1850-55 on the deaths in the Standard Company, it is found that in at least one-eighth of all proposals for assurance, one or more of the immediate relatives have suffered from consumption or other hereditary disease. It follows that the family history in our fifty-four cases of cancer has not been exceptional. Many lives have no doubt been proposed and declined on account of more decided evidence of tubercular taint in their family histories, and it is quite possible that a certain number of these have terminated by cancer, at once confirming Dr. Christison's opinion, and the wisdom of the regulation which excluded them from the benefits of assurance at ordinary rates; but I repeat that the reports relative to the deaths from cancer here recorded furnish no evidence of the equivalence of the tubercular and cancerous dyscrasias.

Tumours of uncertain nature, but most probably malignant, caused four deaths. In all four the family history was satisfactory.

There have been three deaths from Gout; and in all three cases the disease was "retrocedent," or complicated with some lesion of the heart or stomach. One of these cases occurred in a female.

Of what is vaguely termed "Atrophy" three persons died. Of these, two were males, and one a female. In the former, the true nature of the fatal disease cannot be now ascertained, but in the case of the female the following very equivocal family history seems to indicate that consumption or other tubercular complaint was the true cause of death: "Father died, at 42, of a pulmonary complaint; mother, at 42, of some complaint 'not stated'; three brothers and sisters in infancy; one sister at 23, in childbed." These reports relate to a married woman who

appears to have been admitted a member of the Society on the strength of an "unexceptionable personal history" at the age of 34, and who died five years afterwards of some obscure wasting disease.

Debility accounts for 34 deaths, one only of which occurred in a female. Under this head I include, as above explained, "Old Age, or Senile Debility." It appears that twenty-three males and one female died, at ages exceeding 66, of diseases which were either not recognised or not certified, but which were all characterized by debility. If it were thought expedient to classify these deaths under the head "Old Age," we might state the mortality from this cause at 1·3 per 100. But there were other ten cases of deaths, unfortunately attributed to Debility, which occurred at ages between 40 and 64; and as it would be ludicrous to refer these to the "Debility of Middle Life," I leave old and young classified under the same heading, Debility. Perhaps it would be more correct to refer them all to Class XII., or that reserved for "Deaths of Cause Unascertained," where they might conveniently be arranged along with Atrophy.

The deaths of six males and one female are vaguely certified as Sudden. In one case there was a post-mortem examination, which, however, did not elicit the actual cause of death; in most of the remaining cases there seems reason to suppose that there existed disease of the heart or of the aorta.

The average age at death from the diseases of Class II. was 56·59 years, and the average "endurance" of the relative assurances 12·80 years.

On reference to Table (A) it may be seen that our mortality experience in Class II. amounts to very nearly 8·5 per cent. on the number of deaths from all causes. This percentage is about a mean between the numbers which indicate the corresponding

experience of the Scottish Widows' Fund and of the Standard. The North British Company seems to have had a very different experience; for no less than 14·35 per cent. of the deaths on which Dr. Burt has reported are included in Class II. of our Table (A). In explanation, it is right to note, that in Dr. Burt's tables "Dropsy" actually accounts for 3·53 per cent. of the deaths from all causes; that 4·37 per cent. of the gross mortality is exhibited under the objectionable headings "Old Age" and "Atrophy;" that "Hæmorrhage" is so numerously represented that it *probably* includes "Hæmoptysis," a very frequent entry in death-schedules, and one generally referred to the vague heading "Diseases of the Lungs" in Class IV.; that "Inflammation" accounts for ·84 per cent. of deaths in the Report of the North British Company, and for only ·16 per cent. in that of the Scottish Equitable; finally, that in the former the number of deaths attributed to "Mortification," viz., 12 out of 1303, is very large. These considerations, while they sufficiently account for the apparently enormous mortality from the diseases of Class II. recorded in the Report of the North British Company, by no means indicate that less care has been taken by that Office than by others in epitomizing their mortality experience. On the contrary, there can be no doubt that the discrepancy above alluded to must have been due to the forms of the death-certificates received by the various Offices, and not to any want of care in tabulating the information which they furnished.

CLASS III.—*Diseases of the Nervous System.*—Cephalitis, or inflammatory affections of the Brain and its membranes, proved fatal to 18 males and 3 females,—21 in all. In the case of one male, who had almost completed his seventieth

year, the disease originated in the ear or temporal bone ; in another, who died at 57, it was complicated with "ramollissement" and paralysis. The remaining cases proved fatal at ages between 17 and 49. One female had at the time of assurance an "irregular pulse," but on post-mortem examination the heart appeared sound. In seven cases the family history was indifferent, incomplete, or tainted with consumption ; one male had lost his father by apoplexy, and two brothers by consumption ; two had lost their mothers "in childbed,"—always a suspicious feature in an assurance proposal.

There have died of Apoplexy, 107 males and 8 females ; of Paralysis, 63 males and 10 females ; of unspecified Diseases of the Brain, 107 males and 3 females,—298 in all. That the percentage of mortality from these and other diseases of the nervous system is far higher among the assured than among the members of the general population is well known, and will be very apparent from a glance at the columns of Table (A). It occurred to me that this might be sufficiently explained by the fact already mentioned at page 11, that the proportion of young lives at risk is far smaller in assurance societies than in an ordinary population. But, on computing from the data in the Registrar-General's Eighteenth Annual Report, within the limits of the forty-fifth and sixty-fifth years of life, the ratio between the deaths from the diseases of Class III. and the deaths from all causes, I find that it is very nearly 12 per cent., while, within the same limits, the Scottish Equitable experience gives 21 per cent. There is consequently a difference of 9 per cent. in the frequency with which like numbers of the assured and massured, dying at ages between forty-five and sixty five, suffer from fatal head diseases. But when it is considered that the circumstances of the provident classes in some measure protect them from epidemic diseases, and from such

disorders of the respiratory system as are engendered by want, hardship, and unhealthy occupations; that the very fact of a person being assured conveys a sort of guarantee that when accepted he was in sound health and not known to be predisposed to consumption or other causes of early death; that the majority of the assured are persons whose mental energies are habitually strained in the course of their daily business,—it is certainly not surprising that their deaths should be so apportioned among the various causes of mortality as to swell the numbers in Class III. at the expense of those in Classes I. and IV.

Mr. Neison long ago attempted to explain the prevalence of head disease among the assuring classes in Scotland by assuming that they were intemperate,—a theory which received its quietus from Dr. Christison and Dr. Begbie, and which its author would hardly now venture to maintain. The same mortality from brain diseases is common to all offices, English as well as Scotch, which have published an intelligible account of their mortality experience; and at the head of all we may place the “Equitable,” which is, and always was, essentially an English office. It is obviously for the benefit of an assurance society that a large proportion of the deaths of its policyholders should be due rather to the diseases of advanced life than to those peculiar to youth; and it need hardly be added that apoplexy and paralysis are seldom met with in young persons.

The personal and family histories of the large number who have died of head diseases were in no respect remarkable, and in only one or two instances seemed to indicate any unusual tendency to apoplexy or paralysis. One male, who died at the age of 36, had lost a brother and a sister in early life from disease of the brain; one, who died at 31, of apoplexy, connected

with the abuse of alcoholic liquors and opium, was reported to have been "in early life a free liver;" the habits of one or two others were reported "doubtful;" several were spirit-dealers and inn-keepers, but were all believed to be temperate when they joined the Society, although one of them died at 41 of what is termed "apoplexy during an attack of delirium tremens."

Three males have died of Traumatic Tetanus, and twenty-seven of Epilepsy or Epileptiform Convulsions, symptomatic of disease of the cerebro-spinal system. Of the epileptics, one "had been rather dissipated;" three had suffered from acute rheumatism, and one from plenrisy; the family history of four disclosed a consumptive taint, and in other four instances the family history was defective or suspicious. The rest, at the period of assurance, were at least fair average lives.

The deaths of seven males and two females are attributed to Insanity; but it is known that several other deaths took place in asylums; and it is very likely that a considerable number of those included under the vague designation of Diseases of the Brain were in fact cases of insanity.

Delirium tremens and Intemperance proved fatal to no less than 28 males and 2 females. In only one instance did the reports give the slightest hint of the habits of intemperance, to which it is certain that many of these had before assurance been addicted. Six of the deaths occurred among publicans, inn-keepers, and grocers; three among small merchants, and three among bakers. There likewise died one horse-trainer, one commercial traveller, one farmer, one bookseller, one manufacturer, one flesher, one military officer, one ship-broker, one medical man, and a (female) milliner. The occupations of the rest are not known. Though the mortality from delirium tremens here recorded is certainly high, it must be con-

siderably understated, for no doubt "Disease of the Brain" is often the term under which deaths from this disgraceful cause are returned to assurance offices. The disease usually cuts off its victims before the termination of the middle period of life: only three of our cases survived their fifty-fifth year, and twenty had not reached their forty-second.

The average age at which the deaths included in Class III. occurred was 51.54, and the average period during which the assurances had subsisted was 11.38 years.

CLASS IV.—*Diseases of the Respiratory Organs.*—Laryngitis has caused two deaths, both occurring in males. In one case there was chronic ulceration of the larynx; in the other croupal inflammation.

There have been two deaths from Diphtheria; one from (Syphilitic?) Ulceration of the Throat and Mouth; two from "Malignant Sore Throat;" and one from Quinsey. All six occurred in males, and have been, for the sake of brevity, tabulated under the single head of "Quinsey."

Fifty-nine males and eight females—sixty-seven in all—died of Bronchitis. Thirty-three were of ages between 55 and 78; and although the family history of six of these was not satisfactory, there is no reason to believe that any one of them died of "consumption." Of thirty-four who died at ages under 55, three had, before assurance, suffered from "inflammation of the lungs," and one from "an obstinate cough." With the exception of one whose "breathing was rather thick and wheezing" when his proposal was accepted, at the age of 38, all seem to have been in good health when they became members of the Society. In seven instances the family history was incomplete; in four the parents had died young, and for the most

part of chest complaints. In one proposal-paper the mother is stated to have died in "childbed;" in another the deaths of a mother and sister are vaguely ascribed to the same cause. It is all but certain that, in two instances, consumption, and not bronchitis, should have been the cause of death returned in the medical attendants' certificates.

Eight deaths—7 males and 1 female—are attributed to Pleurisy. One male, who died of pleurisy complicated with pneumonia, was at the time of assurance known to be "short-winded and subject to pectoral symptoms, induced by inhaling dust in a cloth-mill." Such a life would not now-a-days be considered eligible for assurance.

There have been 70 deaths—67 males and 3 females—from Pneumonia. In a few instances the disease was complicated with plenrisy; in two or three it was probably associated with pulmonary consumption. It seems likely that some part of the mortality from pneumonia might have been avoided, had it been the custom in the early years of the Society's operations to weigh all the circumstances of the personal and family history of lives proposed for assurance with the same care that is exercised at the present time. Thus, four persons were at the period when they became assured known to be either "free livers," or at least "not strictly temperate;" two had suffered from hæmoptysis; five were "subject to catarrhs;" four had had acute rheumatism; one plenrisy; two pneumonia; one had been "dangerously ill of bowel complaint;" one had lost a leg by amputation after an accident; one was in the habit of being "bled for little or nothing;" and one female was subject to palpitation and menstrual irregularities. I believe that at least seven out of the above list were lives which would not now-a-days be deemed eligible for assurance, more especially since I find that in

some instances there existed very unfavourable points in family history.

In thirty-nine out of the seventy cases the family history was unexceptionable; in eleven it was incomplete; in five unsatisfactory, on account of early or numerous deaths among the members of the immediate family. In two instances the proposer had lost one near relative by consumption; in one instance two, and in another three, deaths had occurred in the family from tubercular disease. Four mothers and one sister were said to have died in "childbed." Two fathers and one sister had been cut off by cancer. One family is reported to have been serofulous. In one instance a father seems to have died at an early age of "asthma;" in another a sister is said to have died of "a cold."

There are 13 deaths ascribed to Hydrothorax, and 3 to Asthma. All occurred in males, and most of them were in all probability connected with some form of heart disease.

Consumption has caused 210 deaths, viz., 187 in males, and 23 in females. The percentage on the mortality from all causes is consequently 11.1 for males, and 13.3 for females. Among the large number who have died of consumption, death has occurred on an average 7.91 years after assurance was effected, while the average tabular expectation of the whole number was 31.24 years. Yet, large as is the loss to the Society which these numbers indicate, it by no means exceeds that which most other assurance offices of similar standing have met with from the same cause; nor does it nearly amount to that which would undoubtedly be experienced in a society consisting of unselected lives. It is obviously highly desirable that the mortality from a cause which operates for the most part at the earlier periods of life, should, among the members of an assurance society, be reduced to a minimum. The mode

of effecting this reduction is now-a-days well understood, and carefully acted on by every prudent office. It is consequently unnecessary to occupy space in this Report in vindicating the expediency of the practice which excludes from the benefits of assurance lives which indicate proclivity to consumption, and which estimates such proclivity by reference not only to the health of persons whose lives are proposed for assurance, but likewise to the health and constitutional peculiarities of their immediate relatives.

On examination of the papers relating to the 210 deaths referred to Consumption, I find that the personal history of the proposer was in 136 instances unexceptionable; in fifty-eight cases rather objectionable, on account of "colds," "indigestion," jaundice, rheumatism, or want of vigour of body; in ten cases, unpromising on account of former attacks of "inflammation of the lungs;" in two cases very suspicious on account of previous hæmoptysis. In two cases the habits of proposers were dubious or intemperate; one male had suffered from "dropsy;" another had lost a leg by amputation after an injury sustained several years before he made his proposal of assurance.

The family history was in 100 cases unobjectionable; in 68 cases it was incomplete, or suspicious on account of early deaths, or deaths without causes assigned; in thirty-nine instances the consumptive taint was admitted, having manifested itself in twenty-three families by the occurrence of one case of phthisis, and in sixteen by the occurrence of two or more; in nine cases the proposer's mother, and in three his sister, had died in "childbed;" in a single instance the mother of the proposer had died of carcinoma.

It may be assumed that at least twenty, and probably a far larger number, of the persons whose personal and family history is here epitomized, would not have been admitted to

the benefits of membership under the rules by which of late years the Directors have been guided in accepting proposals of assurance; and if by the strict observance of these rules the Society's mortality from consumption can in future be diminished by even one per cent., a source of considerable loss will have been averted.

There are certain occupations which seem capable of inducing a form of consumption, even in cases where no constitutional predisposition exists: thus stonemasons, miners, fork-grinders, and flax-dressers are notoriously prone to wasting chest-complaints, and not eligible to assurance on ordinary terms. There are other occupations which, though not directly injurious to health, seem to foster the predisposition to tubercular deposit, and probably shorten the days of a considerable section of the population. I have no means of contrasting, in reference to any occupation, the numbers assured with the numbers who have died of consumption; still, the following details will show clearly enough that in some professions deaths from phthisis have occurred in undue ratio. It is clear that when the circumstances of personal and family history cause any doubt as to the eligibility of a person following certain of these occupations, prudence dictates that the life should be declined. The occupations of 172 out of 210, who have died of consumption, have been recorded. Of mercantile and other clerks, there died 19; of writers, solicitors, and bankers, 14; of merchants (probably in the Scotch acceptation of the term), 10; of mercantile agents and commercial travellers, 10; of spirit and wine dealers, including brewers, 9; of drapers, 9; of clergymen, 8; of grocers, 7; of druggists, 6; of teachers and bakers, 5 each; of tailors and medical men, 4 each. Other forty-three professions furnished from one to three deaths each.

No less than 50 deaths—48 males and 2 females—are attri-

buted rather vaguely to "Disease of Lungs;" and although there is reason to believe that in nine of these cases the true cause of death was "consumption," and in other three cases "disease of the heart," I have not considered myself at liberty to alter the terms used in the Society's certificates.

In twenty-four of these cases the personal history appears from the reports accompanying the proposals to have been "good;" in fourteen cases it was rather unsatisfactory, in consequence of liability to colds, rheumatism, indigestion, the existence of marks of scrofulous abscesses, or obvious want of bodily vigour; one man was subject to "asthma;" one had suffered from "determination of blood to the head;" three had had attacks of pneumonia or pleurisy; one had fistula in ano; three had spat blood; and one who had hernia, was said to have at one time been the subject of an attack of apoplexy.

The family history of fourteen was satisfactory; that of eighteen incomplete; in six instances it was suspicious in consequence of early deaths from uncertain causes among near relatives; one mother and one sister were stated to have died in "childbed"; in nine families there was evidence of the consumptive taint, and in three of these there had been two or more deaths from phthisis.

Record has been kept of the occupations of forty-three. Of these, four were clerks, or at least were habitually engaged at desk work; three were clergymen; three farmers; three drapers; two mineral agents; two medical men; and two teachers. The rest belonged to twenty different professions, which it would be tedious and useless to enumerate. There seems to be good evidence that at least seven of those who have died of "Disease of the Lungs," were, at the time when their proposals were made, not fit subjects for assurance at ordinary rates.

The average age at which death took place, from the causes

embraced in Class IV., was 46·16 years; and the average period during which the assurances subsisted was 9·76 years.

CLASS V.—*Diseases of the Organs of Circulation.*—Six males died of Pericarditis. In three cases the disease is stated to have been “rheumatic”; in one there was complication with diseased heart; in one with pneumonia; and in the last case the disease was hydrops pericardii.

Twenty-seven males died of Aneurism, or other disease of large blood-vessels. In one case it was ascertained by post-mortem examination, that a clergyman of 60 years of age had died of hæmorrhage into the chest, consequent on the rupture of one of the great pulmonary veins. The report on this remarkable case is signed by the late Dr. John Paul of Elgin. All the other cases seem to have been examples of thoracic aneurism.

With one exception, which will be afterwards alluded to, no particular indication of disease was observed at the period of assurance. One man, indeed, at the age of 22, confessed his liability to “palpitation and faintness;” but as his policy endured for fully twenty-one years, it may be assumed that these symptoms did not depend upon organic disease. Two had suffered (one severely) from “rheumatism;” one from “spasmodic stricture of the urethra,” and one from “habits of tippling.”

The family history of eleven was “good,” that of nine “incomplete.” In four families, one or more deaths from consumption had occurred; in two, a mother or a sister had died in “childbed.” The exceptional case above mentioned was that of a gentleman, who had suffered from “hæmoptysis and excessive action of the heart,” whose father had died suddenly, and who

had lost his mother and three sisters by consumption. A more unpromising case for assurance could hardly be imagined; yet his life was accepted at the age of 36, and terminated in about four months thereafter.

Of "Disease of the Heart," including one case of "Arteritis," there have died 164 males and 22 females, being 186 in all. This mortality is certainly heavy, but not more so than might have been fairly calculated on. Indeed, as in the future progress of the Society the average age of the assured becomes higher, so probably will the mortality from heart complaints become even greater than at present. Reference to the columns of Table (C) will show that, of those who have died of heart disease, 88, *i.e.*, 47·3 per cent. were aged 60 years and upwards, while the deaths from consumption in persons of 60 and upwards were only 11, *i.e.*, 5·2 per cent. on the total deaths from that cause. At ages under 40 years again, the respective numbers are 14, or 7·5 per cent. on the fatal cases of diseases of the heart, against 114, or 54·3 per cent. on the total deaths from consumption. The above numbers make it very apparent that it is after middle life that the lethal influence of heart disease chiefly operates.

In 116 of our cases the personal history was, at the period when assurance was effected, fair enough; in seventeen cases there is record of former rheumatism; in one case, of "rheumatism and amanrosis;" in another, of rheumatism, "inflammation," and palpitation. Five persons owned to gont, and one of these added that he once had "disease of the kidney." Four were "asthmatic;" three excessively corpulent; one very tall—6 ft. 6 in. Five had suffered from pneumonia or plenrisy; two from inflammation of the bowels; two from jaundice; two from hæmoptysis; one from palpitation; one from calculus; in one case no personal history has been preserved. In twenty four

instances mention is made in the reports of liability to "colds," "sore-throats," or to various symptoms of dyspepsia, which it would be tedious to enumerate.

In 114 cases the family history was at least fair; in forty-five it was incomplete or suspicious; in fourteen tainted with consumption; in four families more than a single case of phthisis had occurred. Three mothers appear to have died "in childhood." One family is vaguely reported as "disposed to chest disease." Two families were known to be "gouty." One mother died early of rheumatism; and one brother died at 14 of some heart affection.

From the particulars above detailed, it appears that at the period of assurance there was no premonition of the existence of heart disease, except in one or two instances where it seems to have been unaccountably disregarded. Rheumatism or gout had occurred before assurance in twenty-four cases; and in only one of these do any signs of heart disease appear to have existed at the period of proposal. There seems no reason to believe that the diseased condition of the heart has been frequently undetected, for in no branch of pathology is the diagnosis more easy and accurate. It is infinitely more likely that a person whose lungs are studded with tubercle should be passed as sound on medical examination, than that the existence of even a small amount of valvular disease of the heart should be overlooked. There can be no doubt that a large number of applicants have had their proposals of assurance declined by this Society, in consequence of signs of heart disease detected on medical examination, and in many instances quite unsuspected by the parties examined. It is well understood that the necessity for careful medical examination is never more imperative than when an applicant for assurance confesses that he has, within the two or three years immediately preceding his pro-

posal suffered from an attack of acute rheumatism or of "inflammation."

The average age at which deaths from the causes included in Class v. have taken place, is 56·13 years; and the average endurance of the relative policies is 12·71 years.

It may, I think, be predicted, that in the future experience of the Society the percentage of mortality from diseases of the circulatory system will be found to rise in a slight degree with the average age of the Society's members, while the duration of policies lapsing by death, and the ratio between endurance and tabular expectation may likewise be expected to increase.

CLASS VI.—*Diseases of the Digestive Organs.*—Of the inflammatory affections of the stomach and bowels—Gastritis, Enteritis, and Peritonitis—there have died 26 males and 2 females; of Ascites (probably depending on disease of the liver), four males and one female; of Ulceration of the Stomach or Bowels, eleven males and three females; of Strangulated Hernia, for which an operation was performed, one female; of Colic and Ileus, eleven males and one female; of Intussusception, one female; of Stricture of the Intestinal Canal (it is presumed *non-malignant*), five males and one female; of Hæmatemesis, seven males; of complaints vaguely grouped as "Disease of the Stomach or Bowels," and of which a considerable proportion were no doubt of a cancerous nature, thirty-seven males and six females; of disease of the Pancreas, one male; of Hepatitis, eight males and one female; of Jaundice, six males and one female; of various diseases of the Liver, seventy-three males and thirteen females. The whole mortality from diseases of the digestive organs has consequently been 189 males and 31 females; or 220 in all. Many of these cases were admittedly complicated with other diseases, and a

large number would probably have appeared in this Report under the head of Carcinoma, if their exact nature had been ascertained by means of post-mortem examinations.

The general features of the personal history contained in the reports accompanying the proposals of assurance were as follows:—In 139 cases the personal history was fair; in one incomplete; in twenty cases there had been attacks of indigestion; in six “spasm” or “derangement” of the bowels; in four jaundice; in eight long residence in tropical climates, and in four of these attacks of tropical fevers or hepatitis; in six persons hernia existed at the time of proposal, and it seems probable that one of these died of inverted peristaltic action of the bowels, consequent on the condition of the rupture; three were painters, and had suffered from lead colic; twelve had had rheumatism; two gout; two erysipelas; two fistula; two hæmorrhoids; six had suffered from various pectoral complaints, and ten from miscellaneous diseases, unnecessary to enumerate.

The family history of 127 was fair; that of 67 incomplete or suspicious. The consumptive taint existed in 21 families, in five of which two or more of the immediate members had died of phthisis. Two mothers and three sisters had died “in childbed.” One father was gouty, and one mother had died of ileus.

Had the family history been narrowly inquired into in the 67 instances where it was reported incomplete or suspicious, and had the five proposals from members of families deeply tainted with consumption been declined, there seems reason to think that considerable loss to the Society might have been averted. On reference to Table (A) it will be seen that the mortality experienced by the Scottish Equitable from diseases of the digestive organs contrasts favourably with that acknowledged by most of the Scottish life offices.

It need merely be added, that the average age at which death has taken place from the diseases of Class VI. is 51·58 years; and that the average endurance of the relative policies is 11·56 years. The average endurance, according to the abstract given at the conclusion of Dr. Burt's Report, was, among persons assured in the North British Company, only 10·08 years.

CLASS VII.—*Diseases of the Urinary Organs.*—There have died, of Nephritis four; of Ischuria Renalis two; of Diabetes ten; of disease of the Bladder or Prostate twelve; of Stone four; and of Stricture of the Urethra six. All of these 38 cases were males.

Personal objections existed at the period of assurance to twenty-one of the above list. It was reported that two had stricture; one gout; one gravel; one jaundice; one gallstones; one pneumonia; and one enlarged liver. The remaining objections consisted for the most part of liability to rheumatism, "biliousness," and indigestion.

The family history of twelve was incomplete; that of one vitiated by the deaths of several relatives from scrofulous or malignant diseases; in another family there had been several cases of insanity; in another a sister had died of cancer; one family was "gouty;" one mother and one sister had died "in childbed."

Disease of the Kidney,—by which term Bright's disease is to be almost invariably understood, proved fatal to 56 males and 5 females,—61 in all. In one case consumption, and in another delirium tremens, co-existed with the affection of the kidney.

The personal history at the time of assurance was in thirty-eight cases fair; in twelve rather objectionable, on account of

liability to coughs, dyspeptic symptoms, etc.; more decidedly unfavourable in one case on account of gout and irregular habits; in one on account of hæmoptysis; in one on account of palpitation; and in one on account of liability to constipation and to fits. Other five were reported to have suffered from rheumatism or gout; one from inflammation of the bowels; and one from "inflammation" of some organ not specified.

The family history was fair in thirty-five instances; incomplete in fourteen; tainted with consumption in nine cases, in two of which more than one relative had died of phthisis; tainted with gout in two cases; and with insanity in one only. A father had died at an early age of disease of the kidneys. One sister had died in "childbed."

The average age at which death took place from the Diseases of the Urinary Organs was 52.80 years; and the average endurance of the relative policies was 11.98 years.

CLASS VIII.—*Diseases of the Organs of Generation.*—The deaths of four females are attributed to Childbirth. One of these deaths was occasioned by puerperal peritonitis after delivery; another by some puerperal accident. The precise nature of the other two cases cannot be gathered from the reports.

From Ovarian Diseases there have been three deaths. In one case, the disease was reported as "ovarian abscess;" in another, "ovarian tumour;" and in the third, "ovarian dropsy." One death occurred from some disease of the uterus. Under the head of Carcinoma, as has been already mentioned, two other cases of *malignant* disease of the uterus have been included.

The eight deaths referred to the Diseases of the Organs of Generation occurred at the average age of 44.02 years; and the average endurance of the relative policies was 8.94 years.

CLASS IX.—*Diseases of the Organs of Locomotion, etc.*—One male is reported to have died of Arthritis.

Of Rheumatism there have died nine males. Two of these deaths seem to have been due to cardiac complications or metastasis; in one case there was “metastasis to the brain;” in another some affection of the liver; five appear from the reports to have been uncomplicated, though in all probability the heart was affected in most of them. Two of these fatal cases occurred in men who had before assurance suffered from rheumatism, and one of these had in addition been subject to “colds” and “cystitis,” was also reported as an “apoplectic-looking” subject, and on the whole must have been anything but an eligible “life” for assurance. He died within a year after the acceptance of his proposal. The family history was in four cases incomplete; and in one case a sister had died of consumption.

Two males and two females died of Diseases of the Joints. The personal history of all four was good; and in only one case is there mention made of tubercular disease occurring among members of the family. -

Two males died of disease of the Bones of the Cranium. One of these was unexceptionable both as to personal and family history; the other was reported to have had “some slight affection of the liver,” and likewise some “disorder of the kidneys consequent on a fall.”

The average age at death from the diseases of Class IX. was 44.33 years; and the average endurance of the relative assurances was 9.74 years.

CLASS X.—*Diseases of the Integumentary System, etc.*—There have been seven deaths from Carbuncle—all occurring in males. Five of the seven succumbed at ages exceeding 58

years. The personal history of all had been good up to the date of assurance; the family history was in three instances incomplete.

Two males died of *Fistula in Ano*; and it seems probable that one of these had "pulmonary consumption," and that the diseases of the bowels and of the bladder from which he was reported to have died were, strictly speaking, mere complications.

One male died in his seventy-second year, of chronic "*Eczema* over the whole body."

There were in all ten deaths from the diseases of Class x.

The average age at death was 58.34 years; and the average endurance of the relative assurances was 17.48 years.

CLASS XI.—*Violent Deaths*.—Sixty-six males and two females, sixty-eight in all, have died of causes referrible to this class. Of the above number, fifty-five deaths appear to have been accidental, although a few of the relative death-certificates are couched in terms which do not absolutely exclude the suspicion of suicide or foul play.

Twenty-three persons died in consequence of accidents or wounds, sustained or received under circumstances not specified. Three were killed by carriage accidents; two by horseback accidents; two by railway accidents; one by a machinery accident; and one (a medical man) by falling over a cliff while traversing a remote Highland district at night. Two died from gunshot wounds accidentally received; two by poison administered, it is presumed accidentally, by themselves. Nineteen were drowned—for the most part "at sea"—though eight are merely reported as "found drowned."

There have been at least thirteen cases of Suicide. In five of these cases the manner of death is undefined. Two died by

poison ; two by wounds of the throat ; two by hanging ; one by drowning ; and one by pistol-shot.

Although on examining the papers relative to the thirteen persons who perished by suicide, I find that only one would now-a-days be ranked as a "first-class life," yet in only two, or at the most three, instances is any statement recorded either in regard to personal or family history which could possibly have warranted their exclusion from the benefits of life assurance. In several cases, mention is made in the proposal of liability to "bilious attacks," or to "dyspepsia,"—vague terms, which have no definite meaning, and which suggest the expediency of further inquiry in every case in which they are used. In not even a solitary instance is the vice of "intemperance" alluded to in the papers which describe the habits of the thirteen persons who committed suicide ; neither is evidence of proclivity to insanity to be found. It must, however, be remarked in reference to insanity, that inquiries on this head do not appear from the Society's earlier papers to have been systematically made, or at all events generally recorded in the course of filling up the medical report on family history ; and it may be added, that in five of the suicidal cases the family history is little better than a blank.

In reference to the two cases of accidental poisoning, it is right to state that one of them was a female of about 52 years of age, who died, about a year after assurance was effected, of an overdose of morphia ; and who was discovered to have been a confirmed "opium-eater," a most important fact which was not communicated to the Society at the date of proposal. The other case was that of a male who died at the age of 50 after having been twenty three years assured, and who swallowed a poisonous dose of morphia while in a state of intoxication.

The average age of those who have died a violent death was 47·97; and the average endurance of their policies was 8·54 years.

CLASS XII.—*Causes unascertained.*—To this class we must refer the deaths of five males. Of these, one died in Jamaica in his sixtieth year, and no regular death-certificate has in his case been preserved; two died in England, at the ages of 51 and 53, of “natural causes;” one died at Melbourne in his forty-seventh year, of “natural causes,” according to medical certificate, but of “pulmonary consumption” according to the information contained in a private letter announcing the death. One clergyman died in his fortieth year of what is termed “tic,” or “neuralgia of the head.” Probably this death might have been more appropriately placed in Class III.; but in point of fact its exact nature is unknown, for a post-mortem examination was made, and nothing discovered to account for death, or for the symptoms that preceded it.

The average age of these five males at the time of death was 49·47 years; and the average endurance of their policies of assurance was 14·66 years.

At page 6 reasons have been given for disusing the customary term “Old Age” as a cause of death in the Tables of the present Report. The term can only imply that death has been preceded by debility, without any disease being perceptible, or at least detected. But it by no means follows that the terms “old age” and “debility” are mutually interchangeable when used to denote a cause of death; for “debility” without obvious disease may manifest itself at any stage of human existence, and is in fact fully as frequent about the time of birth as at any subsequent period of life. The Directors of the Scottish Equitable

will of course expect to find in this Report some information as to the numbers of the Society's members who have died at advanced ages; and this information it is hoped that Table (C) will supply in sufficient detail, and in a convenient form. The use of the Table will be best illustrated by an example.

On referring to Dr. Fleming's valuable Report on the Medical Statistics of Life Assurance (page 17), it will be found that the total deaths in the Scottish Amicable Society, during thirty-four years, were 773, and that 120 persons died at ages exceeding 64 years. The mortality at 65 and upwards was consequently 15·524 per cent. of the mortality at all ages. Now, from our Table (C) it is easily seen that the total deaths in the Scottish Equitable Society during thirty-three years have been 1848, and that 291 persons have died at ages exceeding 64. The mortality at 65 and upwards has consequently been 15·747 per cent. of the mortality at all ages, showing a very close approximation between the experiences of the Societies.

In further illustration of the use of Table (C), let us suppose it were inquired, "What number and proportion of our members have died of 'Old Age' (in the popular acceptation of the term) since the institution of the Society?" The answer is at once obtained by summing the numbers in the last four age-columns attached to the disease termed "Debility," thus: $5 + 10 + 6 + 3 = 24$ i.e., $\frac{24}{1848}$, or about 1·3 per cent. have died of "Old Age."

In concluding this Report, I beg to submit a Table (D) showing the average ages at death, the average duration or "endurance of assurance," and the average "expectation" at entry, in relation to each class of diseases. The sexes are distinguished in the first two divisions of the Table, and the united results are given in the third division. The true average age at the period of assurance is stated in the last line of the Table.

(D.) TABLE showing the AVERAGE AGE AT DEATH, the AVERAGE DURATION OF ASSURANCE, and the AVERAGE EXPECTATION AT ENTRY, in relation to each Class of Diseases; the Sexes being distinguished. This Table may be regarded as an Abstract of the Large Table marked (B.)

CLASSES OF DISEASES.	MALES.				FEMALES.				MALES & FEMALES COMBINED.			
	Number of Deaths.	Average Age at Death.	Average of Endurance of Assurance.	Expectation at Entry.	Number of Deaths.	Average Age at Death.	Average of Endurance of Assurance.	Expectation at Entry.	Number of Deaths.	Average Age at Death.	Average of Endurance of Assurance.	Expectation at Entry.
CLASS I. Epidemic, etc., Diseases,.....	210	46'86	8'60	27'47	19	50'68	8'65	26'23	229	47'18	8'60	27'35
II. Diseases of Uncertain Seat,.....	138	56'27	12'95	24'12	19	58'87	11'75	22'97	157	56'59	12'80	23'98
III. " of the Nervous System, ...	360	51'30	11'52	26'48	28	54'64	9'57	24'22	388	51'54	11'38	26'32
IV. " Respiratory Organs,	392	46'20	9'83	28'74	37	45'79	8'94	29'47	429	46'16	9'76	28'81
V. " Circulatory do.	197	56'26	13'05	24'23	22	55'01	9'69	23'89	219	56'13	12'71	24'19
VI. " Digestive do.	189	51'19	11'69	26'67	31	53'96	10'75	25'11	220	51'58	11'56	26'45
VII. " Urinary do.	94	52'76	12'17	25'88	5	53'56	8'43	24'27	99	52'80	11'98	25'80
VIII. " Generative do. ....	...	...	...	...	8	44'02	8'94	30'61	8	44'02	8'94	30'61
IX. " Organs of Locomotion,.....	14	44'77	10'55	29'80	2	41'21	4'08	29'65	16	44'33	9'74	29'79
X. " Integumentary System,....	10	58'34	17'48	25'80	...	...	..	...	10	58'34	17'48	25'80
XI. Violent Deaths,	66	47'41	8'41	27'03	2	66'48	12'92	18'67	68	47'97	8'54	26'79
XII. Causes Unascertained,.....	5	49'47	14'66	29'46	...	...	...	...	5	49'47	14'66	29'46
From all Causes,.....	1675	50'44	11'03	26'72	173	52'16	9'71	25'81	1848	50'60	10'90	26'63
True Average Age when first Assured,...	MALES, 39'41 years.				FEMALES, 42'45 years.				PERSONS, 39'70 years.			

It appears from the numbers given in this Tabular Abstract that the ratios between the "endurance" of policies which have emerged by death, and the "expectation" calculated on the ages assumed¹ when these policies were originally granted, have been rather different in the classes of males and females. The ratios have been as follows :—

		E.		1 - E.
Males,	$\frac{11.03}{26.72}$	or .4128,	whence	.5872.
Females,	$\frac{9.71}{25.81}$	or .3762,	whence	.6238.
Persons,	$\frac{10.90}{26.63}$	or .4093,	whence	.5907.

The first column of decimals, marked E, represents the fraction of their tabular expectation which each class of lives have enjoyed ; the second column, marked 1 - E, represents the defect by which the same lives have fallen short of their tabular expectation.

No great importance is attached to these numbers ; still it is interesting to observe that they tend to show that the female lives have been decidedly less favourable as assurance risks than the male lives, so far at least as the comparison of policies which have lapsed by death can prove. And perhaps it is permissible here to express an opinion that, whatever may be the rule deducible from the Registrar-General's statistics, derived from analysing the movement of the whole population of the country, the practice of assurance offices is sound, in not accepting the lives of females at lower annual premiums than those which are exacted from males.

¹ In the columns of Table (B), headed "Age at Assurance," the *assumed age as per next birthday* is to be understood as expressed ; and *this age* has been used in calculating the "expectation." The true age at assurance may (for any disease or class of diseases) be readily obtained, by subtracting the average endurance from the average age at death. The average assumed age exceeds the average true age by about four months.

I have only to add, that I trust the preceding pages will be found to contain a fair and intelligible abstract of the ample material which has been at my disposal, and that, whether for the purpose of collation with the experience of kindred institutions, or as a starting-point for future Reports to this Board, the Medical Statistics of the Scottish Equitable Society will henceforth be readily available.

Reported by

WILLIAM ROBERTSON, M.D.

1st March 1865.

(B.)—MORTALITY EXPERIENCE of THE SCOTTISH EQUITABLE LIFE ASSURANCE SOCIETY, from 1831 to 1864, being a period of Thirty-three Years. Exhibiting, in relation to each Disease, the Number of Deaths, the Average Ages at Death, the Average Assumed Ages at Entry, the Average Endurance of First Policies, and the Average Expectation deduced from the Assumed Ages at Entry.

DISEASES.	MALES.					FEMALES.					MALES AND FEMALES COMBINED.					CLASSES OF DISEASES.
	Number of Deaths.	Average Ages at Death.	Average Ages at Entry.	Average Endurance.	Average Expectation.	Number of Deaths.	Average Ages at Death.	Average Ages at Entry.	Average Endurance.	Average Expectation.	Number of Deaths.	Average Ages at Death.	Average Ages at Entry.	Average Endurance.	Average Expectation.	
Small-pox,	5	43.07	38.20	4.96	27.62	5	43.07	38.20	4.96	27.62	1. EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES. 229 = 12.3918 per cent.
Scarlatina,	8	36.68	32.12	4.87	31.77	...	.....	.....	.....	.....	8	36.68	32.12	4.87	31.77
Diarrhoea,	12	56.15	44.92	11.57	23.35	1	51.18	41.00	10.39	27.06	13	55.77	44.62	11.48	23.63	
Dysentery,	21	50.85	39.38	12.05	27.02	3	60.24	55.67	4.92	17.21	24	52.03	41.42	11.16	25.79	
Cholera,	19	52.21	42.63	10.00	25.08	3	47.21	38.00	9.85	29.01	22	51.53	42.00	9.98	25.61	
Influenza,	7	57.91	51.14	7.21	19.28	1	60.92	49.00	12.27	21.75	8	58.29	50.88	7.84	19.59	
Fever,	117	43.82	36.49	7.67	28.89	9	46.95	39.33	7.98	28.06	126	44.04	36.69	7.70	28.84	
Erysipelas,	21	50.76	41.52	10.07	25.58	2	52.97	41.00	12.80	26.90	23	50.96	41.48	10.31	25.69	
Inflammation,	3	40.49	37.00	4.10	28.54	...	.....	.....	.....	.....	3	40.49	37.00	4.10	28.54
Hæmorrhage,	2	61.33	51.50	10.15	19.01	1	44.32	44.00	.79	25.09	3	55.66	49.00	7.03	21.04	
Dropsy,	23	55.91	44.48	11.84	23.66	4	60.40	48.50	12.10	22.03	27	56.58	45.07	11.88	23.49	
Abscess,	9	41.90	34.44	7.76	30.25	...	.....	.....	.....	.....	9	41.90	34.44	7.76	30.25
Mortification,	8	57.92	43.50	14.96	24.27	1	76.54	55.00	21.74	17.62	9	59.99	44.78	15.72	23.53	
Purpura,	1	42.38	33.00	9.56	31.15	...	.....	.....	.....	.....	1	42.38	33.00	9.56	31.15
Carcinoma,	45	53.64	42.13	11.93	25.16	9	58.27	48.44	10.44	22.05	54	54.41	43.19	11.68	24.66	
Tumour,	4	50.04	35.50	15.20	29.52	...	.....	.....	.....	.....	4	50.04	35.50	15.20	29.52
Gout,	2	43.31	36.00	7.65	29.18	1	69.62	58.00	11.71	15.64	3	52.08	43.33	9.00	24.67	
Atrophy,	2	49.50	39.00	10.51	27.22	1	38.77	34.00	5.13	31.64	3	45.92	37.33	8.72	28.69	
Debility,	33	68.13	51.33	17.34	19.15	1	74.93	49.00	26.46	21.75	34	68.33	51.27	17.61	19.22	
Sudden,	6	50.83	38.50	12.66	27.56	1	48.24	24.00	15.08	38.17	7	50.46	36.43	13.00	29.08	
Cephalitis,	18	38.87	32.17	7.02	31.79	3	29.69	26.67	3.51	36.47	21	37.56	31.38	6.52	32.46	
Apoplexy,	107	51.96	41.08	11.25	25.86	8	58.54	49.75	8.10	21.17	115	52.42	41.69	11.03	25.53	
Paralysis,	63	60.08	46.14	14.26	22.55	10	62.43	49.50	13.32	21.34	73	60.40	46.60	14.13	22.39	
Tetanus,	3	43.72	36.00	7.90	29.19	...	.....	.....	.....	.....	3	43.72	36.00	7.90	29.19
Epilepsy,	27	46.44	35.96	10.91	29.23	...	.....	.....	.....	.....	27	46.44	35.96	10.91	29.23
Insanity,	7	50.73	42.14	8.64	25.17	2	54.20	46.50	8.29	23.42	9	51.34	43.11	8.56	24.78	
Delirium Tremens,	28	42.28	34.32	8.42	30.28	2	32.23	32.00	.47	32.94	30	41.61	34.17	7.89	30.46	
Disease of Brain,	107	51.40	39.63	12.18	26.88	3	58.46	45.00	13.99	24.35	110	51.59	39.77	12.22	26.77	
Laryngitis,	2	37.05	31.00	6.59	32.47	...	.....	.....	.....	.....	2	37.05	31.00	6.59	32.47
Quinsey,	6	42.47	32.17	10.65	31.73	...	.....	.....	.....	.....	6	42.47	32.17	10.65	31.73
Bronchitis,	59	55.37	40.90	13.83	25.33	8	60.85	48.62	12.56	21.90	67	56.02	42.70	13.68	24.92	
Pleurisy,	7	47.66	37.43	10.68	28.27	1	31.66	23.00	8.78	38.82	8	45.67	35.63	10.45	29.59	
Pneumonia,	67	52.05	40.37	12.01	26.34	3	44.87	36.00	9.37	30.30	70	51.74	40.20	11.90	26.50	
Hydrothorax,	13	56.59	43.15	13.67	24.45	...	.....	.....	.....	.....	13	56.59	43.15	13.67	24.45
Asthma,	3	65.57	51.67	14.31	18.91	...	.....	.....	.....	.....	3	65.57	51.67	14.31	18.91
Consumption,	187	40.67	33.10	7.92	31.14	23	40.79	33.22	7.81	32.04	210	40.68	33.11	7.91	31.24	
Disease of Lungs,	48	44.90	37.44	7.98	28.27	2	51.45	45.00	6.91	24.32	50	45.16	37.74	7.94	28.11	
Pericarditis,	6	47.39	37.50	10.04	28.22	...	.....	.....	.....	.....	6	47.39	37.50	10.04	28.22
Aneurism,	27	47.54	38.74	9.17	27.41	...	.....	.....	.....	.....	27	47.54	38.74	9.17	27.41
Disease of Heart,	164	58.02	44.62	13.80	23.55	22	55.01	45.64	9.69	23.89	186	57.66	44.74	13.31	23.59	
Gastritis and Enteritis,	15	43.14	36.40	7.19	28.97	2	63.59	52.50	11.54	19.35	17	45.55	38.29	7.71	27.84	
Peritonitis,	11	49.65	39.91	10.21	26.63	...	.....	.....	.....	.....	11	49.65	39.91	10.21	26.63
Ascites,	4	48.47	39.00	9.98	27.27	1	44.52	34.00	11.41	31.64	5	47.68	38.00	10.27	28.14	
Ulceration,	11	47.82	37.45	10.64	28.30	3	54.02	43.00	11.20	25.65	14	49.15	38.64	10.76	27.73	
Hernia, . . . . .	...	.....	.....	.....	.....	1	42.55	43.00	.37	25.75	1	42.55	43.00	.37	25.75
Colic, or Ileus,	11	56.49	40.55	16.50	26.24	1	56.67	57.00	.16	16.29	12	56.50	41.92	15.14	25.41	
Intussusception, . . . . .	...	.....	.....	.....	.....	1	67.53	53.00	15.30	19.01	1	67.53	53.00	15.30	19.01
Stricture of Intestines,	5	55.27	39.00	16.63	27.21	1	40.55	27.00	13.91	36.20	6	52.82	37.00	16.17	28.71	
Hæmatemesis,	7	55.05	45.00	10.17	23.11	...	.....	.....	.....	.....	7	55.05	45.00	10.17	23.11
Disease of Stomach, etc.,	37	54.71	44.32	10.79	23.73	6	48.50	35.33	13.43	30.67	43	53.84	43.07	11.16	24.70	

(C.)—DEATHS among Persons Assured in THE SCOTTISH EQUITABLE LIFE ASSURANCE SOCIETY from 1831 to 1864, being a Period of Thirty-three Years, referred to Quinquennial Periods of Life; also Percentage of Mortality from each cause of Death.

DISEASES.	AGES AT DEATH.														TOTAL CASES.	PERCENTAGES.	CLASSES OF DISEASES.
	Under 20 Years.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.	45 and under 50.	50 and under 55.	55 and under 60.	60 and under 65.	65 and under 70.	70 and under 75.	75 and under 80.	80 and upwards.			
Small-pox,	1	1	1	1	1	5	.27056	1. EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES. 229 = 12.3918 per cent.
Scarlatina,	1	.....	1	2	4	.....	.....	.....	.....	.....	.....	.....	.....	8	.43290	
Diarrhoea,	1	1	1	1	2	2	3	3	.....	.....	.....	.....	13	.70346	
Dysentery,	1	1	1	4	2	2	4	1	1	3	1	3	.....	24	1.29870	
Cholera,	1	1	1	3	4	1	5	3	3	.....	.....	.....	22	1.19048	
Influenza,	1	4	2	1	8	.43290	2. DISEASES OF UNCERTAIN SEAT (OLD AGE INCLUDED). 157 = 8.4957 per cent.
Fever,	1	5	6	12	24	24	18	16	8	8	1	.....	.....	.....	126	6.81819
Erysipelas,	4	2	2	4	3	1	3	2	1	1	.....	23	1.24459	
	1	7	9	20	35	37	28	28	21	21	16	2	4	.....	229	
Inflammation,	2	1	3	.16234	3. DISEASES OF THE NERVOUS SYSTEM. 388 = 20.9957 per cent.
Hæmorrhage,	1	.....	.....	1	1	.....	.....	.....	.....	3	.16234	
Dropsy,	2	1	4	10	1	1	5	1	1	1	27	1.46104	
Abscess,	2	.....	.....	4	1	2	.....	.....	.....	.....	.....	.....	9	.48701	
Mortification,	1	1	1	4	1	.....	1	1	.....	9	.48701	
Purpura,	1	1	.05411	4. DISEASES OF THE RESPIRATORY ORGANS. 429 = 23.2143 per cent.
Carcinoma,	1	1	1	4	13	11	6	7	6	4	.....	.....	54	2.92208	
Tumour,	1	2	.....	1	.....	.....	.....	.....	.....	4	.21645	
Gout,	1	.....	.....	1	.....	.....	1	.....	.....	.....	3	.16234	
Atrophy,	1	.....	1	1	.....	.....	.....	.....	.....	.....	3	.16234	
Debility,	3	2	2	1	4	5	10	6	3	34	1.83983	5. DISEASES OF THE ORGANS OF CIRCULATION. 219 = 11.8506 per cent.
Sudden Death,	2	2	1	1	1	.....	.....	.....	.....	7	.37879	
	3	3	5	17	24	29	15	16	17	16	8	4	157		
Cephalitis,	2	4	1	3	.....	6	3	.....	1	.....	1	.....	.....	.....	21	1.13636
Apoplexy,	1	5	12	14	15	24	11	13	12	5	3	115	6.22205	6. DISEASES OF THE DIGESTIVE ORGANS. 220 = 11.9048 per cent.
Paralysis,	1	.....	3	3	4	8	11	13	16	12	2	.....	73	3.95023	
Tetanus,	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....	3	.16234	
Epilepsy,	3	3	7	6	4	1	1	2	.....	.....	.....	27	1.46104	
Insanity,	1	.....	1	1	2	3	1	.....	.....	.....	.....	9	.48701	
Delirium Tremens and Intemperance,	1	3	4	4	8	5	3	2	30	1.62338	7. DISEASES OF THE URINARY ORGANS. 99 = 5.3571 per cent.
Disease of Brain,	1	1	.....	4	14	16	15	14	13	14	12	6	.....	.....	110	5.95239
	3	6	6	21	36	55	50	53	43	44	43	23	5	.....	388	
Laryngitis,	1	1	2	.10822	8. DISEASES OF THE ORGANS OF GENERATION. 8 = 0.4329 per cent.
Quinsey,	1	.....	.....	.....	2	3	.....	.....	.....	.....	.....	.....	.....	6	.32467	
Bronchitis,	1	3	4	5	8	13	7	11	4	4	7	.....	67	3.62554	
Pleurisy,	2	2	.....	2	.....	1	.....	1	.....	.....	.....	8	.43290	
Pneumonia,	2	4	6	9	11	9	10	5	8	4	1	1	70	3.78788	9. DISEASES OF THE ORGANS OF LOCOMOTION. 16 = 0.8658 per cent.
Hydrothorax,	1	1	2	1	1	5	2	.....	.....	.....	13	.70346	
Asthma,	1	2	.....	.....	.....	3	.16234	
Consumption,	3	9	19	41	42	25	26	21	13	6	4	1	.....	.....	210	11.36365
Disease of Lungs,	4	4	11	9	4	5	7	5	.....	1	.....	.....	50	2.70563	
	3	12	28	51	67	51	56	49	38	34	20	11	8	1	429		10. DISEASES OF THE INTEGUMENTARY SYSTEM. 10 = 0.5411 per cent.
Pericarditis,	1	1	2	1	1	.....	.....	.....	.....	.....	6	.32467	
Aneurism,	1	3	2	7	2	7	1	3	1	.....	.....	.....	27	1.46104	
Disease of Heart,	2	2	2	8	14	18	28	24	26	36	19	6	1	186	10.06494	
	2	3	5	11	22	22	36	26	29	37	19	6	1	219		
Gastritis and Enteritis,	2	2	1	2	1	5	1	3	17	.91991	11. VIOLENT DEATHS. 68 = 3.6796 per cent.
Peritonitis,	2	1	2	1	1	2	.....	.....	1	1	.....	11	.59524	
Ascites,	1	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	5	.27056	
Ulceration of Stomach, etc.,	1	.....	2	1	1	1	4	.....	3	.....	.....	1	.....	14	.75758	
Hernia,	1	.05411	12. CAUSES UNASCERTAINED. 5 = 0.2706 per cent.
Colic or Ileus,	1	.....	1	.....	.....	1	3	1	1	3	.....	.....	12	.64935	
Intussusception,	1	.....	.....	.....	1	.05411	
Stricture of Bowels,	2	1	1	.....	1	.....	1	.....	.....	6	.32467	
Hæmatemesis,	1	.....	2	2	2	2	.....	.....	.....	.....	7	.37879	
Disease of Stomach, etc.,	1	2	3	6	4	6	5	8	3	4	1	43	2.32684	10. DISEASES OF THE IN- TEGUMENTARY SYSTEM. 10 = 0.5411 per cent.
Disease of Pancreas,	1	.....	.....	.....	.....	1	.05411	
Hepatitis,	2	.....	1	2	1	.....	2	.....	1	.....	.....	9	.48701	
Jaundice,	1	.....	.....	.....	1	1	1	1	1	1	.....	.....	.....	7	.37879	
Disease of Liver,	1	.....	7	5	5	22	16	17	3	5	3	1	1	86	4.65368	
	5	5	16	14	22	33	38	31	27	11	13	4	1	220		11. DISEASES OF THE OR- GANS OF GENERATION. 8 = 0.4329 per cent.
Nephritis,	3	.....	.....	1	.....	.....	.....	.....	4	.21645	
Ischuria,	1	.....	1	.....	.....	.....	.....	2	.10822	
Diabetes,	2	1	.....	1	2	2	1	1	.....	.....	.....	10	.54113	
Cystitis,	2	2	2	4	2	.....	12	.64935	
Stone,	1	1	1	1	4	.21645	12. CAUSES UNASCERTAINED. 5 = 0.2706 per cent.
Stricture,	1	.....	1	.....	2	1	.....	1	.....	6	.32467	
Disease of Kidneys,	3	2	6	7	15	9	12	5	1	1	.....	.....	61	3.30086	
	3	4	7	8	20	14	17	12	6	5	3	.....	99		
Childbirth,	1	2	1	4	.21645	9. DISEASES OF THE OR- GANS OF LOCOMOTION. 16 = 0.8658 per cent.
Ovarian Dropsy,	1	.....	.....	1	.....	.....	.....	.....	1	.....	.....	3	.10234	
Disease of Uterus,	1	.....	.....	.....	.....	.....	.....	1	.05411	
	2	2	1	1	1	.....	.....	.....	1	.....	.....	8		
Arthritis,	1	.....	.....	.....	.....	.....	1	.05411	
Rheumatism,	2	5	1	1	9	.48701	10. DISEASES OF THE IN- TEGUMENTARY SYSTEM. 10 = 0.5411 per cent.
Disease of Joints,	2	.....	2	.....	.....	.....	.....	.....	.....	.....	4	.21645	
Disease of Bones,	1	.....	.....	1	.....	.....	.....	.....	.....	.....	2	.10822	
	5	6	3	1	2	.....	.....	.....	.....	.....	16		
Carbuncle,	1	1	2	2	1	7	.37879	11. VIOLENT DEATHS. 68 = 3.6796 per cent.
Fistula in Ano,	1	.....	.....	.....	1	.....	.....	.....	.....	2	.10822	
Skin Disease,	1	.....	.....	1	.05411	
	2	.....	1	2	3	1	1	.....	.....	10		
Violent Deaths,	2	4	15	10	11	9	9	4	1	.....	.....	3	68	3.67965	
Deaths from Causes Un- known,	1	1	2	1	5	.27056	12. CAUSES UNASCERTAINED. 5 = 0.2706 per cent.
TOTAL,	7	32	59	126	198	230	249	261	205	190	152	91	38	10	1848	100'	

